weeks or a month. The growth is then resected, and the divided end of the sigmoid is sutured to that of the rectum. If the rectal resection is not too low suturing in the narrow space available is possible, though difficult. However, since the bowel is functionless and fairly clean, so long as the cut edges are correctly apposed, very accurate suturing is not essential, but adequate drainage in such a loosely sutured anastomosis is essential.

In the other method, a three-stage operation (Fig. 7), the anastomosis is not made at once after resection, as in the first method, but the severed rectum is sutured, the peritoneum is closed over it, and the divided end of the sigmoid is implanted in the wound. Six months later, when the rectal stump is firmly covered with peritoneum, when the distal colon and the rectum are almost free from infection, and when the patient, free from the toxic effects of the cancer, is greatly improved in general health, the sigmoid is connected to the rectum by making, in the following way, a "telescopic" anastomosis (Fig. 8) in which no sutures are used.

The distal colon is mobilized and drawn through an opening which is made in the stump of the now peritoneum-covered rectum; it is then fixed in this position. The closed rectal cavity is now laid widely open by cutting this sphincter. When the sphincter is cut there is very little difference in principle between drawing the bowel end through the peritoneum-covered abdominal wall on to its surface, in order to make an artificial anus, and drawing it through the peritoneum-covered rectum into a rectal space, which is wide open externally. By the time the recto-sigmoid junction is complete the sphincter has healed; in order to make the patient again continent it only remains to reconnect the colonic segments.

Closure of the Disconnecting Anus.—Using the enterotome which I have specially designed, I clamp the spur for forty-eight hours, and then cut it through by further pressure (Fig. 9). The subsequent closure of the disconnecting anus is very simple. Five or six days later I inject novocain round the bowel-ends, which are then dissected from the skin and muscle and, with the small openings in the abdominal wall, closed. Closure is, as a rule, prompt. Since the bowel openings are small, and the mucous membrane does not pout, they sometimes close naturally after cutting the spur.

Results

So far the series of patients on whom I have operated by the "defunctioning" method is too small to make any generalization. The results, however, even in the most difficult cases, have been so successful, and show so clearly the great potentialities of operating by this principle, that surgery of the distal colon has no longer, for me, the anxiety that it formerly held.

I have been able to unite successfully the upper part of the sigmoid colon to the upper third of the rectum in a man who suffered from carcinoma of the lower end of the sigmoid and from diabetes, and who had acute intestinal obstruction. In two cases, where most of the sigmoid and the upper part of the rectum was removed, I have been able to unite the remainder of the sigmoid to a small rectal pouch by means of a "telescopic" operation.

In cases in which a sutured anastomosis was made on the "defunctioned" colon the convalescence of the patients was remarkably quiet and the abdominal cavity manifested no reaction of any sort. In one operation, which involved the removal of a large carcinoma of the transverse colon adhering to an abdominal scar and also that of a segment of small intestine—quite a big operation—the subsequent convalescence was so smooth and so free from reaction that one could not but be struck with the very great advantage of these operations on the "defunctioned" colon.

Conclusions

The mortality rate in carcinoma of the colon can be improved by:

- (a) Early diagnosis, attained by early x -ray examination by modern methods.
- (b) In distal colon carcinoma, by operations on the "defunctioned" and prepared distal colon.
- (c) In resection of recto-sigmoid growths, by anastomosing the sigmoid to the rectum in a "defunctioned" and prepared distal colon, so as to preserve continence.
- (d) In proximal colon carcinoma, by using the clamp and enterotome method (after my method).

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THE DIAGNOSIS OF DOUBTFUL CASES OF SCARLET FEVER

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One problem which causes considerable administrative difficulty in a fever hospital is that of the doubtful case of infectious disease. Medical officers in fever hospitals are familiar with the case sent into hospital with a certificate of infectious disease, and classified on admission under one of the following categories:

1. No evidence of infectious disease.
2. Some evidence—probably not infectious disease.
3. Some evidence, not conclusive—probably disease as certified.
4. Infectious disease other than that certified.

The question probably arises most frequently in the case of scarlet fever, and the isolation accommodation of the hospital may be seriously embarrassed by large numbers of these doubtful cases during an epidemic of this disease. The Dick test and the Schultz-Charlton reaction may be helpful, but both are of limited application and value. This is particularly so in the case of the Schultz-Charlton test when the rash is absent or ill defined.

A similar difficulty arises when a child develops a scarlatiniform rash in a diphtheria, measles, or other ward. Should the ward be quarantined or not? The placing of a ward in quarantine involves considerable expense due to the lengthened isolation of contacts and the temporary loss of valuable accommodation. Any method which will avoid or reduce this loss of available beds is worthy of serious consideration.

Bacteriological Evidence

With a view to determining whether the bacteriological investigation of doubtful scarlet fever cases would be of any assistance in diagnosis, we swabbed 100 such cases, either on admission or as they occurred in non-scarlet-fever wards. Swabs were taken from each nostril

and from the throat and examined for haemolytic streptococci. Serological typing was undertaken in respect of all strains of *Streptococcus pyogenes* isolated. The results of the examination of these swabs are shown in Table I.

TABLE I.—*The Occurrence of Streptococcus pyogenes in 100 Consecutive Cases of Scarlet Fever Clinically Doubtful and their Serological Identification when Present.*

<i>Streptococcus pyogenes</i> present		60 cases
" " absent		40 "
Serological Type	Number of Strains	Percentage of Strains
1	6	(31) = 51.6
2	5	
3	11	
4	9	
5	1	(24) = 40.0
6	2	
8	3	
9	1	
12	5	
14	4	
15	1	
17	1	
22	3	
26	1	
27	1	
Unidentified strains	5	(5) = 8.4
Total	60	

It will be noted that forty patients yielded no haemolytic streptococci. The usual period of detention of doubtful cases of scarlet fever is two to three weeks, and, in ordinary practice, these forty patients would have remained under observation in hospital for this period. They were, in fact, detained for three weeks, in spite of the bacteriological findings, in order to enable a diagnosis on clinical grounds alone to be made if possible. As a result it was found that, so far as infection with scarlet fever was concerned, these patients could have been discharged on the negative laboratory finding with perfect safety within one week of admission. The saving, from the point of view of both hospital expense and isolation accommodation, is obvious. It must be realized, however, that a small number of these patients were suffering from illnesses—for example, lobar pneumonia—which necessitated a longer period of hospital treatment, but not necessarily isolation hospital treatment.

History and Symptomatology

Having decided by the bacteriological examination, the clinical course of the illness, and the absence of complications associated with scarlet fever that these forty patients had not suffered from scarlatinal infection, we endeavoured to assess the value of the history of the mode of onset and the clinical findings at the time of admission from the point of view of confirming or eliminating the diagnosis of scarlet fever.

Mode of Onset.—The history prior to admission was inconclusive. In some cases there was a typical history of headache, sore throat, vomiting, and rash, but no haemolytic streptococci were found, and the diagnosis from a clinical standpoint was not confirmed. In others the history was atypical (rash only), yet the bacteriological diagnosis of scarlet fever was positive, and was confirmed by the subsequent clinical course and complications.

State on Admission.—In 54 per cent. of all the cases examined there were erythematous rashes, mainly faint but scarlatiniform. The incidence of rashes in the bacteriologically negative and positive groups was almost equal. Tonsillar exudate was present in eight of the forty negative cases and in sixteen of the sixty in whom haemolytic streptococci were found. Punctuation of the soft palate was only observed in three cases, and in each instance the diagnosis of scarlet fever was confirmed

clinically and bacteriologically. Evidence from the tongue was of no value, nor was that derived from the temperature and pulse rate. Desquamation, consistent with convalescence from scarlet fever, was eventually present in 40 per cent. of the positive cases. No case in the bacteriologically negative group desquamated. Only those complications frequently associated with scarlet fever were considered. Fourteen (23.3 per cent.) of the positive cases showed one or more complications. None of the negative cases developed complications.

Results of Swabbing

Concurrently with the examination of swabs from the doubtful cases of scarlet fever, and as a control to them, similar swabs were taken from 100 consecutive cases of scarlet fever which on admission appeared clinically typical. Tables I and II show the occurrence of *Streptococcus pyogenes* and the distribution of the serological types in the two series, the types being those defined by Griffith.¹ In the series of typical cases (Table II) it will be noted that the scarlatinal types 1, 2, 3, and 4 represent 79.4 per cent. of the strains isolated; six of the less common types formed 15.5 per cent.; and five strains (5.1 per cent.) could not be classified. In three instances two distinct serological types were isolated from the nose and throat of the same patient.

TABLE II.—*The Occurrence of Streptococcus pyogenes in 100 Consecutive Cases of Scarlet Fever, Clinically Typical on Admission and their Serological Identification when Present.*

<i>Streptococcus pyogenes</i> present		94 cases
" " absent		6 "
Serological Type	Number of Strains	Percentage of Strains
1	21	79.4
2	27	
3	17	
4	12	
5	3	15.5
8	6	
11	2	
12	2	
14	1	
27	1	5.1
Unidentified strains	5	
Total	97*	

* Three patients were infected with two distinct serological types.

Haemolytic streptococci were not isolated in six patients in the series. This may have been due to faulty swabbing or to the presence of a temporarily inaccessible focus of infection. One of these six patients was found to have a septic lacerated wound of the wrist, which was not swabbed, and this may have been the site of a streptococcal infection. The difference between these findings and those in the doubtful cases (Table I) is striking.

It will be observed in Table I that, taking the sixty cases which yielded haemolytic streptococci, and could therefore be regarded as possible cases of scarlet fever, only eleven (18.3 per cent.) were infected with Types 1 and 2, which are known to produce the more severe and toxic forms of illness,^{2 3 4 5} whereas the corresponding figures in Table II are forty-eight (51 per cent.). Taking the four types 1, 2, 3, and 4, which may be regarded as the commonest scarlatinal types, Table I shows that they contributed 51.6 per cent. of the cases, whereas Table II shows 79.4 per cent. of such infections.

The other serological types which may produce the scarlatinal syndrome, but more often fail to do so, constituted 48.4 per cent. in Table I and 20.6 per cent. in Table II. These types, although capable of causing epidemics of tonsillitis¹ (in schools and similar institutions), appear to possess, as a rule, insufficient toxigenic power for the production of the typical scarlatinal rash. This incapacity, coupled with a partial or complete anti-

toxic immunity in the subjects infected with the other types, probably accounts for the *formes frustes*, making up the sixty clinically atypical cases of the first series. It would have been interesting to record the Dick reactions in these 100 doubtful cases on admission and during their stay in hospital, but, unfortunately, this was not done.

Administrative Applications

Originally the principal objective of the isolation hospital was the prevention of spread of infectious disease in the community. The failure of this objective has, however, been realized for a long time. The isolation hospital is now designed chiefly for the specialized treatment of these cases. If it can be shown that 40 per cent. of doubtful cases of scarlet fever are not infectious, and, indeed, in most instances do not require hospital treatment of any kind, the advantages to the hospital administration obtained by the rapid discharge of such patients are enormous.

Some difficulty arises in the proposal for early discharge. One is somewhat reluctant, from the point of view of medical etiquette, to send a patient home within a few days of admission, since it may place the certifying practitioner in an awkward position in relation to his patients. In an endeavour to overcome, or at any rate mitigate, this difficulty a system of notification of wrong diagnosis to the certifying practitioner and the medical officer of health was introduced by the Metropolitan Asylums Board. This practice was abandoned in 1922, mainly, as was stated at the time, because the information so supplied was "neither appreciated nor desired" by the practitioner concerned. (The medical officer of health is still notified of the ultimate diagnosis of the disease.) Nevertheless, the discharge of a wrongly certified case of scarlet fever on negative bacteriological and doubtful clinical findings would probably necessitate some form of notification by the hospital for the information of the general practitioner.

The disagreement with the certified diagnosis, based on the additional evidence of bacteriological results, is less open to question than if it depended on clinical examination alone. At present the practice at different fever hospitals varies. At this hospital (the Brook Hospital, Shooters Hill) the parents are informed verbally at the time of discharge that the patient has been under observation, since there was some doubt about the diagnosis, and that the infection may have been a very mild attack of scarlet fever. Stress is laid on the fact that, in the opinion of the hospital authorities, the practitioner was justified in sending the patient into an isolation hospital. So far this practice has given rise to no trouble.

Hitherto the chief difficulty, especially during epidemic periods, has been the lack of sufficient cubicle isolation accommodation or single-bed wards to cope with large numbers of these doubtful cases. When insufficient isolation beds are available many clinically doubtful cases of scarlet fever must be admitted to the scarlatinal wards, with the result that patients not suffering from the disease may become infected in the ward. This difficulty is being overcome in the L.C.C. infectious diseases hospitals by the provision of additional isolation accommodation, so that the isolation accommodation will form one-third of the total available beds. It will then be possible to segregate all doubtful cases until a diagnosis on bacteriological and/or clinical grounds has been made. The patients may subsequently be discharged home or allocated to the appropriate general wards.

In order to make a diagnosis on bacteriological grounds too much reliance should not be placed on one negative

swab. Various factors, already mentioned, may be responsible for a negative culture, even when haemolytic streptococci are present. Possibly two negative swabs should be required, but in view of the subsequent uncomplicated course and doubtful clinical signs in forty cases we feel we were justified in accepting one negative as confirmatory evidence of the absence of scarlatinal infection.

In the detection of *Streptococcus pyogenes* on primary plates it is necessary to gain experience of the appearance of their colonies, and particular methods of culture have been recommended by Griffith.¹ The use of other culture media and the neglect of careful observation of the colonies and their haemolytic action may easily lead to erroneous identification.

It is interesting to record that an almost pure growth of pneumococci from the throat was found in eleven of the forty negative cases; seven of these eleven patients had on admission a flush or punctate rash which was suggestive of a mild attack of scarlet fever. In one of these the ultimate diagnosis was lobar pneumonia and in another bronchopneumonia. The remaining nine patients presented no symptoms suggesting pneumococcal infection.

Summary

Many patients, especially during epidemic periods, are sent into hospital certified as suffering from scarlet fever, and their clinical condition on admission gives rise to doubt as to the accuracy of the diagnosis.

A considerable number of these patients, clinically doubtful on admission, might be discharged with safety within a few days as the result of negative bacteriological findings.

The presence or absence of haemolytic streptococci in swabs from the nose, throat, septic wounds, burns, etc., in a patient with a scarlatiniform rash will, in many cases, be of valuable assistance in arriving at a correct diagnosis, and it is suggested that a bacteriological examination of such swabs might with advantage be made in any case in which the clinical diagnosis is doubtful.

Reference is made to the special technique required in bacteriological work of this kind.

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J. Bláha, writing in *Zentralbl. f. Gynäk.* (March 30th, 1935), describes the case of a woman admitted to hospital after six weeks' amenorrhoea and a day after she had attempted to introduce into her uterus a semi-rigid india-rubber catheter, which had disappeared with the onset of pain and bleeding. Sounding of the cervix showed a perforation of the parametrium, but an x-ray examination and laparotomy both failed to locate the catheter. The uterine contents, when curetted, were foul. On the fifth day sudden pain in the left clavicle and arm accompanied a fit of coughing. After death on the seventh day necropsy showed, as anticipated, pleural effusion and gangrene of the lungs, but in addition a catheter 23.5 cm. long was found passing from the inferior vena cava through the right auricle into the superior vena cava, innominate vein, and left jugular vein. Purulent phlebitis could be traced from the superior vena cava to the right parametrium, and the perforation of the cervix communicated with the lumen of the right internal pudic vein. The patient appeared to have survived two days after the entrance of the catheter, on the fifth day, into the heart.